said photovoltaic cells including a supporting electrically conductive cell foil having a top surface and a bottom surface separated by a thickness,

said photovoltaic calls further comprising semiconductor material positioned on at least a portion of said top foil surface,

said cell foil having a foil length and foil width, the extent of said foil width specifying a linear dimension whose endpoints define first and second terminal edges of said cells,

Sub B1

said substrate structure comprising one or more conductive substrate regions having an electrically conductive top surface, said conductive top surface having a conductive top surface width dimension defined as being in the direction of net current flow between series connected cells, the endpoints of said conductive top surface width dimension defining first and second terminal edges of said conductive surface,

said substrate further comprising one or more insulating regions having a non-conductive top surface,

said combination characterized by having said bottom surface of said cell foil of a first of said cells attached to said conductive top surface of a first of said conductive regions and having said bottom surface of said cell foil of a second of said cells being attached to said non-conductive surface of a first of said insulating substrate regions,

said combination further characterized by having cell positioning of said cells on said substrate such that a line drawn in said conductive surface width direction between said terminal edges of said conductive surface is intersected by a said cell terminal edge of at most a single cell.

Claim 2. The combination of claim 1 wherein said electrically conductive cell foil is metal-based.

Claim 3. The combination of claim 1 wherein said electrically conductive cell foil thickness is between .001 cm. and .025 cm.

Claim 4. The combination of claim 1 wherein said cell foil is substantially devoid of holes extending through said cell foil thickness.

Claim 5. The combination of claim 1 wherein said photovoltaic cells and said substrate structure are initially separate and distinct.

Claim 6. In combination, multiple photovoltaic cells and a substrate structure,

said photovoltaic cells comprising semiconductor material positioned on at least a portion of the top surface of a supporting electrically conductive cell foil,

A1

said cell foil having a bottom surface oppositely disposed to said top surface and separated from said top surface by a thickness,

said substrate structure comprising one or more electrically conductive substrate regions,

said one or more electrically conductive substrate regions comprising conductive substrate material extending over a selected material length and a material width, said material width defined as being in the direction of net current flow between series connected cells in a final array, the full extent of said conductive material width defining first and second terminal edges of said conductive substrate region,

said substrate further comprising an electrically non-conductive substrate region positioned vicinal a said terminal edge of a first of said conductive substrate regions,

said combination characterized by having at least a portion of said cell foil bottom surface of a first cell attached to said conductive region and having a least a portion of said bottom cell foil surface of a second cell attached to said non-conductive substrate region

said cells being initially separate and distinct from said substrate structure.

Claim 8. The combination of claim 7 wherein said electrically conductive cell foil is metal-based.

Claim 9. The combination of claim 7 wherein said electrically conductive cell foil is substantially devoid of holes extending through said cell foil thickness.

Claim 10. The combination of claim 7 wherein said cell foil thickness is between .001 cm. and .025 cm.

A1

Claim 11. In combination, multiple photovoltaic cells and a substrate structure,

said photovoltaic cells comprising semiconductor material positioned on at least a portion of the top surface of a supporting electrically conductive cell foil

said supporting cell foil and having a bottom surface oppositely disposed to said top surface and separated from said top surface by a thickness,

Sub B2

said supporting cell foil having a foil length and foil width, the full extent of said foil width specifying a linear dimension whose endpoints define first and second cell foil terminal edges,

said substrate structure comprising one or more electrically conductive substrate regions,

said one or more electrically conductive substrate regions comprising conductive substrate material extending over a selected material length and a material width, said

material width defined as being in the direction of net current flow between series connected cells in a final array, the full extent of said conductive material width defining first and second terminal edges of said conductive substrate region,

said substrate further comprising an electrically non-conductive substrate region joined to a first of said conductive substrate regions,

said combination characterized by having at least a portion of said bottom surface of said supporting cell foil of a first of said cells attached to said first of said conductive substrate regions and having at least a portion of said bottom surface of said supporting cell foil of a second of said cells being attached to said non-conductive substrate region,

said combination further characterized by having cell positioning of said cells on said substrate such that a line drawn in said material width direction between said terminal edges of said first of said conductive substrate regions is intersected by a said cell foil terminal edge of at most a single cell.

Claim 12. The combination of claim 11 wherein said foil is metal-based.

Claim 13. The combination of claim 11 wherein said cell foil thickness is between .001 cm. and .025 cm.

Claim 14. The combination of claim 11 wherein said supporting cell foil is substantially devoid of holes extending through said foil thickness.

Claim 15. The combination of claim 11 wherein said photovoltaic cells are initially separate and distinct from said substrate structure.

Claim 16. The combination of claim 11 wherein a selected one of said conductive substrate regions has top and bottom conductive substrate region surfaces, at least a portion of said top conductive region surface being conductive, said cell foil of said first

of said cells being positioned over at least a portion of said top conductive region surface, said combination further characterized by having at least a portion of said bottom conductive region surface being conductive, there being electrical communication between said conductive portions of said top and bottom conductive region surfaces, said conductive portion of said bottom conductive region surface area being at least partially exposed.

Sub B3

Claim 17. The combination of claim 16 wherein said wherein said selected conductive substrate region includes non-conductive material.

17 10

Claim 18. The combination of claim 11 wherein electrical joining is achieved between said cell foil of said first of said cells and said conductive substrate region, said electrical joining extending in the direction of said cell foil length.

A1

Claim 19. In combination, multiple photovoltaic cells and a substrate structure,

said photovoltaic cells comprising semiconductor material positioned on at least a portion of a top surface of a supporting cell foil,

Sub B4

said supporting foil being metal-based and having a bottom surface separated from said top surface by a thickness,

said cell metal-based foil having a foil length, a foil width, and a foil thickness, the full extent of said foil width specifying a linear dimension whose endpoints define first and second cell foil terminal edges,

said cell metal-based foil thickness being between .001 cm. and .025 cm.,

said substrate structure comprising one or more electrically conductive substrate surfaces,

a first of said one or more electrically conductive substrate surfaces extending over a conductive surface width defined as being in the direction of net current flow between series connected cells in a final array, the full extent of said electrically conductive surface width defining first and second terminal edges of said electrically conductive surface,

said substrate further comprising at least one electrically non-conductive substrate surface,

said combination characterized by having said bottom surface of said foil of a first of said cells attached to a first of said electrically conductive substrate surfaces,

said combination further characterized by having cell positioning of said cells on said substrate such that a line drawn in said conductive surface width direction between said terminal edges of any selected said first of said conductive substrate surfaces is intersected by a said cell terminal edge of at most a single cell.

Claim 19. The combination of claim 18 wherein said support structure is substantially devoid of holes extending through said support structure thickness.

Claim 20. The combination of claim 18 further characterized by said photovoltaic cells being initially distinct and separate from said substrate structure.

Claim 21. In combination, two or more photovoltaic cells and a substrate structure for facilitating interconnections among two or more of said cells, said combination characterized by having,

-each of said cells comprising semiconductor material and a transparent electrode positioned on a supporting structure comprising a metal-based foil and having top and bottom support structure surfaces, said support structure being substantially devoid of

holes extending through said support structure from said top to said bottom support structure surfaces, and

- said substrate structure comprising one or more units, each of said units comprising contiguous electrically conductive and electrically insulating regions, said electrically conductive region being distinct from said transparent electrode, said electrically conductive region having top and bottom conductive region surfaces,

said combination characterized in that said supporting structure of a first of said cells is positioned to overlay at least a portion of said conductive region of a first of said units and electrical joining is achieved between said supporting structure lower surface of said first of said cells and said electrically conductive region of said first of said units,

said combination further characterized by having said supporting structure of a second of said cells joined to said insulating region of said first of said units.

A1

Claim 22. The combination of claim 21 wherein said bottom conductive region surface of said first of said units is at least partially exposed.

Claim 23. The combination of claim 21 wherein said substrate structure is flexible.

Claim 24. The combination of claim 21 further characterized by said cells being initially distinct and separate from said substrate.

Claim 25. The combination of claim 21 wherein said metal-based foil has a thickness between .001 cm. and .025 cm.

Claim 26. In combination, multiple photovoltaic cells and a substrate structure,

said photovoltaic cells comprising a supporting structure having top and bottom supporting structure surfaces separated by a supporting structure thickness,

each of said cells further comprising semiconductor material positioned on at least a portion of said top supporting structure surface,

said supporting structure comprising metal-based foil having a length and a width, the full extent of said foil width defining first and second terminal width edges of said metal-based foil,

said combination characterized by having two or more of said cells placed on said substrate positioned such that a said first terminal width edge of said foil of a first of said cells is separated from said second terminal width edge of said foil of an adjacent second of said cells leaving a gap therebetween,

said combination further characterized by having holes extending from said top to said bottom substrate surfaces positioned within said gap.

A1

Claim 27. The combination of claim 26 further characterized by having conductive material within a portion of said holes.

Claim 28. The combination of claim 26 further characterized by the absence of holes extending through said supporting structure thickness.

Claim 29. The combination of claim 26 further characterized by said cells being initially distinct and separate from said substrate structure.

Following entry of the instant amendment, the pending claims will be independent claims 2, 7, 11, 19, 22, 27 and dependent claims 3 - 6, 8 – 10, 12 – 18, 20 – 21, 23 – 26, and 28 – 30. Entry is respectfully requested.

Respectfully submitted,

Daniel Luch April 9, 2001

Daniel Luch